

WHAT IS CLAIMED IS:

1. A seeding tool for dispensing seeds and fertilizer into a furrow in soil created by the seeding tool, said seeding tool comprising:

a knife opener having a tip at a leading end thereof for creating a furrow;

5 a liquid wing insert on a side of said knife opener to provide spacing between said seeds and fertilizer;

said liquid wing insert being a multi-faceted structure having (i) a base mounted on said side of said knife opener, and (ii) a side face spaced apart from said base;

10 said side face of said liquid wing insert having a lower rearward member defining a maximum outward-most member of said liquid wing insert from said side of said knife opener; and

15 said side face of said liquid wing insert oriented at a compound angle relative to said side of said knife opener such that from said outward-most member said side face inclines inwardly both toward said side and toward said leading end of said knife opener to create a small leading member of said liquid wing insert which displaces soil easily and presents minimal resistance.

2. The seeding tool of claim 1 wherein said multi-faceted structure of said liquid wing insert further comprises a six faced structure, and wherein front, top, rear, and lower faces extend between said base and said side face to form said six faced structure.

3. The seeding tool of claim 2 wherein each of said six faces is comprised of four sides.

4. The seeding tool of claim 2 further comprising two edges of said insert formed by an intersection of two sides of said side face with one side of each of said rear and lower faces, said two edges intersecting at a point, said point being said outward-most member of said insert, and at least one of said two edges being
5 chamfered to prevent chipping thereof.

5. The seeding tool of claim 4 further comprising said point being spaced from said side of said knife opener from about 0.5 to about 1.5 inches.

6. The seeding tool of claim 2 further comprising an intersection of a longest side of said side face and a side of said top face provided with a concave outwardly opening radius forming a ramp-like feature.

7. The seeding tool of claim 2 further comprising each of said top and lower faces tapering from a wider trailing end of said insert to narrower leading end of said insert, such that said front face has a minimal size to present minimal impedance to the soil.

8. The seeding tool of claim 1 further comprising a raised boss provided on the side of the knife opener and said base mounted on said raised boss.

9. The seeding tool of claim 8 further comprising said raised boss having substantially planar mounting surface on which said base is mounted.

10. The seeding tool of claim 8 further comprising said mounting surface oriented at compound angle to said side of knife opener.

11. The seeding tool of claim 8 further comprising said raised boss having a shape generally corresponding to the shape of said base such that said raised boss is generally a lower extension of said liquid wing insert which enables said liquid wing insert to be made smaller while maintaining said outward-most member thereof a
5 desired distance from said side of said knife opener.

12. The seeding tool of claim 8 further comprising said raised boss having a channel therein, said channel sized to receive a fertilizer dispensing tube member which can be attached to said seeding tool.

13. The seeding tool of claim 12 further comprising a bottom surface of said knife opener adjacent said raised boss having a second channel therein which is generally aligned with said channel in said raised boss.

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14. A modular seed planting system comprising an elongated tool bar supported for movement by a plurality of wheels and which is adapted to be towed in a given forward direction by a power, and attached to the tool bar are a plurality of seeding tools mounted along the length thereof, and wherein each seeding tool
5 comprises:

a knife opener having a tip at a leading end thereof for creating a furrow;

a liquid wing insert on a side of said knife opener to provide spacing between said seeds and fertilizer;

said liquid wing insert being a multi-faceted structure having (i) a base
10 mounted on said side of said knife opener and (ii) a side face spaced apart from said base;

said side face of said liquid wing insert having a lower rearward member defining a maximum outward-most member of said liquid wing insert from said side of said knife opener; and

15 said side face of said liquid wing insert oriented at a compound angle relative to said side of said knife opener such that from said outward-most member said side face inclines inwardly both toward said side and toward said leading end of said knife opener to create a small leading member of said liquid wing insert which displaces soil easily and presents minimal resistance.

15. The modular seed planting system of claim 14 wherein said multi-faceted structure comprises a six faced structured, and wherein front, top, rear, and lower faces extend between said base and said side face to form said six faced structure.

16. The modular seed planting system of claim 15 wherein each of said six faces is comprised of four sides.

17. The modular seed planting system of claim 15 further comprising two edges of said insert formed by an intersection of two sides of said side face with one side of each of said rear and lower faces, said two edges intersecting at a point, said

point being said outward-most member of said insert, and at least one of said two
5 edges being chamfered to prevent chipping thereof.

18. The modular seed planting system of claim 17 further comprising said point being spaced from said side of said knife opener from about 0.5 to about 1.5 inches.

19. The modular seed planting system of claim 15 further comprising an intersection of a longest side of said side face and a side of said top face provided with a concave outwardly opening radius forming a ramp-like feature.

20. The modular seed planting system of claim 15 further comprising each of said top and lower faces tapering from a wider side at a trailing end of said insert to narrower side at a leading end of said insert, such that said front face has a minimal size to present minimal impedance to the soil.

21. The modular seed planting system of claim 14 further comprising a raised boss provided on the side of the knife opener and said base removably mounted on said raised boss.

22. The modular seed planting system of claim 21 further comprising said raised boss having substantially planar mounting surface on which said base is removably mounted.

23. The modular seed planting system of claim 21 further comprising said mounting surface oriented at compound angle to said side of knife opener.

24. The modular seed planting system of claim 21 further comprising said raised boss having a shape generally corresponding to the shape of said base such that said raised boss is generally a lower extension of said liquid wing insert which enables said liquid wing insert to be made smaller while maintaining said outward-
5 most member thereof a desired distance from said side of said knife opener.

25. The modular seed planting system of claim 21 further comprising said raised boss having a channel therein, said channel sized to receive a fertilizer dispensing tube member which can be attached to said seeding tool.

26. The modular seed planting system of claim 25 further comprising a bottom surface of said knife opener adjacent said raised boss having a second channel therein which is generally aligned with said channel in said raised boss.

27. A liquid wing insert for a knife opener of a seeding tool to provide spacing between seeds and fertilizer which are dispensed by the seeding tool, said liquid wing insert comprising:

5 a multi-faceted structure having (i) a base mounted on a side of said knife opener, and (ii) a side face spaced apart from said base;

said side face of said liquid wing insert having a lower rearward member defining a maximum outward-most member of said liquid wing insert from said side of said knife opener; and

10 said side face of said liquid wing insert oriented at a compound angle relative to said side of said knife opener such that from said outward-most member said side face inclines inwardly both toward said side and toward a leading end of said knife opener to create a small leading member of said liquid wing insert which displaces soil easily and presents minimal resistance.

28. The liquid wing insert of claim 27 wherein said multi-faceted structure comprises a six faced structured, and wherein front, top, rear, and lower faces extend between said base and said side face to form said six faced structure.

29. The liquid wing insert of claim 28 wherein each of said six faces is comprised of four sides.

30. The liquid wing insert of claim 28 further comprising two edges of said insert formed by an intersection of two sides of said side face with one side of each of said rear and lower faces, said two edges intersecting at a point, said point being said

outward-most member of said insert, and at least one of said two edges being
5 chamfered to prevent chipping thereof.

31. The liquid wing insert of claim 30 further comprising said point being spaced from said side of said knife opener from about 0.5 to about 1.5 inches.

32. The liquid wing insert of claim 27 further comprising an intersection of a longest side of said side face and a side of said top face provided with a concave outwardly opening radius forming a ramp-like feature.

33. The liquid wing insert of claim 27 further comprising each of said top and lower faces tapering from a wider side at a trailing end of said insert to narrower side at a leading end of said insert, such that said front face has a minimal size to present minimal impedance to the soil.

34. The liquid wing insert of claim 27 wherein said liquid wing insert is comprised of a tungsten carbide.

35. The liquid wing insert of claim 34 wherein said liquid wing insert is further comprised of a 10 percent or greater cobalt grade of tungsten carbide.

36. The liquid wing insert of claim 27 wherein said liquid wing insert is comprised of a ceramic material.